

## A Cross-Sectional Observational Study Evaluating the Prevalence and Effects of Allergic Rhinitis in School-Aged Children (3-15 Years Old)

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Conflict of interest: Nil

### Abstract

**Aim:** To evaluate the prevalence and impact of allergic rhinitis in school going children. **Methods:** A cross-sectional observational study was conducted in the Department of ENT, Jannayak Karpoori Thakur Medical College and Hospital, Madhepura, Bihar, India for 1 year. 200 parents of school going children attending OPD in community health center were included in this study. Participants were aged 20 years or above, currently residing in Bihar and parent/guardian of at least one child aging 3 to 15 years, having frequent episodes of allergic rhinitis. **Results:** 74.5% of subjects responded that the child's nose problem was worse during specific months of the year; and 60.5% said that the problem is accompanied by itchy–watery eyes. 90 patients found this eye-nose problem with a source of allergy. 17% of subjects agreed to this problem impacting daily activities and hence QoL. This study showed a prevalence of 30% for nasal symptoms and 15% for allergic rhino-conjunctivitis respectively. Distribution of symptoms showed that blockers constituted as much as 59.5% of the total study group. Moderate to severe persistent allergic rhinitis, as classified as per ARIA guidelines, was most common type of allergic rhinitis with as many as 35% of patients studied. Minimum 55% of subjects had one or more co-morbidity (mainly bronchial asthma 55%), whereas 21% children had 2 or more co-morbidities. **Conclusion:** The Indian population, especially children, suffering from prevalence of allergic rhinitis is increasing over past many years. Allergic rhinitis is associated with number of co-morbid conditions such as asthma, sinusitis, otitis media, etc.

**Keywords:** Allergic Rhinitis, Children, Asthma.

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### Introduction

Allergic rhinitis (AR) is one of the most common chronic disorders of the pediatric

population. About 44–87% of patients with rhinitis may have a combination of allergic and

nonallergic rhinitis[1]. Regardless of the high prevalence of AR in childhood, the disease is often underdiagnosed or undertreated. Untreated and undertreated AR deteriorates the quality of life of the child and his or her family. AR places a financial burden on the healthcare system, including direct and indirect costs. Due to an increase in the prevalence of allergic conditions in Western and developing countries, the reason of which was unknown, Asher and coworkers founded the International Study of Asthma and Allergies in Childhood (ISAAC) in 1991, which is a unique worldwide epidemiological research programme. In Phase I, using standardised and validated questionnaires for 6–7-year-old and 13–14-year-old schoolchildren, they estimated the prevalence of allergic diseases around the world[2]. Phase II was based on the findings of Phase I, but beyond the prevalence data, it also measured the possible etiological factors of asthma, rhino conjunctivitis and eczema. After a 5–10-year interval, Phase III provided follow-up data in multiple centres worldwide[3]. According to this study, the prevalence of AR varied between 0.8 to 14.9% in 6–7-year olds and 1.4 to 39.7% in 13–14-year old children worldwide. Phase III of ISAAC examined the possible risk factors of AR with new questions. Genetic factors, family history of atopy and allergic diseases play an influential role in AR presentation. However, environmental factors and lifestyle had also been considered important in the disease.

In the ISAAC phase III research (2009) the Hungarian data (measured in 2003) were also published: the prevalence of AR symptoms was 12.9% in children aged 6–7-years and 17.1% in children aged 13–14 years[4]. To date, there has been a limited number of epidemiological studies in the population of 6–12-year-old pupils in Hungary. AR presentation and manifestation might be affected by several factors, but their exact nature remains poorly understood.

## Materials and methods

A cross-sectional observational study was conducted in the Department of ENT, Jannayak Karpoori Thakur Medical College and Hospital, Madhepura, Bihar, India for 1 year, after taking the approval of the protocol review committee and institutional ethics committee.

## Methodology

After taking informed consent detailed history was taken from the patient or the relatives. The technique, risks, benefits, results and associated complications of the procedure were discussed with all patients. 200 parents of school going children attending OPD in community health center were included in this study. Participants were aged 20 years or above, currently residing in Bihar and parent/guardian of at-least one child aging 3 to 15 years, having frequent episodes of allergic rhinitis.

## Inclusion and exclusion criteria

Patients were included by enquiring about their history of sneezing, runner itchy nose and eyes, thick mucus, nasal blockage or breathless with associated symptoms; while age above 15 years or any pathology associated rhinitis were excluded from the study.

A questionnaire was prepared to analyze the symptoms and history of rhinitis among children, which followed the standard sequence and method developed by ISAAC Steering Committee about cough and the medical care of asthma, rhinitis and eczema[6]. This questionnaire, as given in Table 1 below, was put before 450 parents and study population was decided from the first 200 parents who responded in positive to the question no: 1 of the questionnaires.

## Results

74.5% of subjects responded that the child's nose problem was worse during specific months of the year; and 60.5% said that the problem is accompanied by itchy–watery eyes.

90 patients found this eye-nose problem with a source of allergy. 17% of subjects agreed to this problem impacting daily activities and hence QoL (Table 1).

This study showed a prevalence of 30% for nasal symptoms and 15% for allergic rhinoconjunctivitis respectively.

Distribution of symptoms showed that blockers constituted as much as 59.5% of the total study group. (Table 2.) Moderate to

severe persistent allergic rhinitis, as classified as per ARIA guidelines, was most common type of allergic rhinitis with as many as 35% of patients studied. Table 3.

Minimum 55% of subjects had one or more comorbidity (mainly bronchial asthma 55%), whereas 21% children had 2 or more comorbidities. The prevalence of different comorbidities is shown in table no.4.

**Table 1: Rhinitis-specific questionnaire items**

<b>Q. no.</b>	<b>Questions</b>	<b>Response rate</b>	<b>Percent (%)</b>	<b>Remarks</b>
<b>1</b>	In the past 12 months, has your child ever had a problem with sneezing, or a runny or blocked nose when he/she did not have cold or flu? (If your answer is NO, please skip questions: 2-6)	200/450	44.44	Yes
<b>2</b>	If yes, is the child's nose problem worse during specific months of the year?	149/200	74.5	Yes
<b>3</b>	Has this nose problem been accompanied by itchy–watery eyes?	121/200	60.5	Yes
<b>4</b>	If yes, does this nose and eye problem occur when your child is in the same room with a cat, dog, disturbance of house dust, or when outdoors near freshly cut grass?	77/121	63.64	Yes
<b>5</b>	In the past 12 months, how much did this nose problem interfere with your child's daily activities?	34/200	17	Not at all
<b>6</b>	In the past 12 months, has your child had "hay fever"?	90/200	45	Yes

**Table 2: Symptom distribution**

<b>Symptom distribution</b>	<b>Number</b>	<b>%</b>
Sneeze Runners	81	40.5
Blockers	119	59.5

**Table 3: Severity of symptoms among the patients studied**

<b>Severity of symptoms</b>	<b>Number</b>	<b>%</b>
Moderate/severe & persistent	70	35
Mild & persistent	57	28.5
Moderate/severe & intermitter	44	22
Mild & intermittent	29	14.5

**Table 4: Co-morbid conditions of allergic rhinitis**

<b>Co-morbid conditions of allergic rhinitis</b>	<b>Number</b>	<b>%</b>
Bronchial asthma	110	55
Sinusitis allergic	63	31.5
Atopic dermatitis	55	27.5
Conjunctivitis	30	15
Recurrent otitis media	40	20
Adenoids	40	20
Asthma	37	18.5
Sleep Disturbance	19	9.5
Nil	90	45

## Discussion

It is a known fact that as much as 30% of Indian population, which included children as well, suffers from at least one allergic disease[5]. Reported incidence of allergic rhinitis in India also ranges between 20% and 30%[6]. Allergic rhinitis is on the rise in India over past few years. According to international study of asthma and allergies in childhood (ISAAC) phase 3 (2009), in India, prevalence of nasal symptoms was as high as 12.9% and 23.6% in 6-7- and 13-14-year age groups, respectively, while that of allergic rhino-conjunctivitis were 3.9% and 10.4% respectively[2]. While in our own study, which correspond to the age group 3-to-15-year age, the figures were 30% and 15% respectively.

Allergic rhinitis is there as ‘sneeze runners and blockers’ because it is identified due to its distinct clinical profile. In such patients who are allergic as well as ‘sneezers and runners’, the main symptoms are: sneezing, itchy nose, itchy eyes and anterior rhinorrhea. Patients who are ‘blockers’, have nasal congestion with thick mucus with postnasal drip and breathlessness as predominant symptom[7]. Our study also showed significantly higher proportion of blockers (59.5%) than sneeze runners (40.5%), quite similar to the study by Deb et al, but dissimilar in the sense that their patients screened were adults with allergic rhinitis[7].

A study conducted in Mysore showed a consistently rising trend of allergic rhinitis in children from 6-14 years old over period of 15 years from 1998 to 2013 (Figure 5)[8]. Our result also showed higher prevalence also corresponding to this study’s prevalence of 21.2% for the year 2013.

Allergic rhinitis can be associated with number of co-morbid conditions such as asthma, sinusitis, otitis media, atopic dermatitis and nasal polyps[9]. In the study by Deb et al asthma was the most common co morbid condition, present in almost half of patients[9]. In the present study too, a number of co-morbid conditions are found associated with allergic rhinitis. In children with allergic rhinitis majority of children had one or more comorbidity (55%), whereas 45% had ‘nil’ co-morbidities. A study by Sharma et al also showed that a total of 41.9% children had no recorded co-morbid condition[10].

Common allergens to allergic rhinitis were found to be mostly perennial or seasonal and duly present in the indoor and outdoor environment. The most common ones are: Pollens (grass, trees, and weeds), house dust mites, pets, molds, fungi and food[7].

## Conclusion

The present study concluded that the Indian population, especially children, suffering from prevalence of allergic rhinitis is increasing over past many years. Allergic rhinitis is

associated with number of co-morbid conditions such as asthma, sinusitis, otitis media, etc. Allergic rhinitis adversely affects quality of life of patients and furthermore studies should be conducted for more clarity on the subject. AR should not be ignored as any other allergy and timely medical intervention and treatment could possibly avoid the rising morbidity associated with the disease.

## Reference

1. Wallace DV, Dykewicz MS, Bernstein DI, et al. The diagnosis and management of rhinitis: an updated practice parameter. *J Allergy Clin Immunol.* 2008;122(2 Suppl):S1–84.
2. Asher MI, Keil U, Anderson HR, et al. International Study of Asthma and Allergies in Childhood (ISAAC): rationale and methods. *Eur Respir J.* 1995;8(3):483–91.
3. Ellwood P, Asher MI, Beasley R, Clayton TO, Stewart AW, ISAAC Steering Committee. The international study of asthma and allergies in childhood (ISAAC): phase three rationale and methods. *Int J Tuberc Lung Dis.* 2005;9(1):10–6.
4. Aït-Khaled N, Pearce N, Anderson HR, et al. Global map of the prevalence of symptoms of rhinoconjunctivitis in children: The International Study of Asthma and Allergies in Childhood (ISAAC) Phase Three. *Allergy.* 2009;64(1):123–48.
5. Prasad R, Kumar R. Allergy situation in India: what is being done? *Indian J chest dis allied Sci.* 2013; 55:7-8.
6. Varshney J, Varshney. Allergic rhinitis: an overview. *Indian J otolayngol Head Neck Surg.* 2015;67(2):143-9.
7. Deb A, Mukherjee S, Saha BK, Sarkar BS, Pal J, Pandey et al. profile of patients with allergic rhinitis: a clinic based cross sectional study from Kolkata, India. *J Clin Diagn Resp.* 2014;8(1):67-70.
8. Chandrika D. Allergic rhinitis in India: an overview. *Int J Otorhinolaryngol Head Neck Surg.* 2017; 3:1-6.
9. Pherwani A, Manekkar G, Chavan K, Periera C, Bansode G. The study of comorbid conditions in adults with allergic rhinitis from Mumbai, Maharashtra, India and their comparison with children. *Ind J otolryngol Head Neck Surg.* 2009;61(1):5-8.
10. Sharma D, Dutta BK, Singh AB. Prevalence of allergic diseases in humid tropical climate of south Assam, India. *Global J immunol allergic dis.* 2014; 2:1-10.